

REMARKS

Claims 12-14 are all the claims presently pending in the application. By this amendment, claims 1-11 are canceled and new claims 12-14 are added.

It is noted that Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-11 stand rejected under 35 U.S.C. §112, first paragraph. Claims 1-11 stand further rejected under 35 U.S.C. §103(a) over Richardson (US 6,081,912) in view of Snyder, et al. (US 6,064,586). Claims 1-11 are canceled by this amendment; thus, the rejection of claims 1-11 is moot. However, Applicants also submit that new claims 12-14 are patentable over the cited references, as discussed below.

THE CLAIMED INVENTION

As described, for example, by independent claim 12, the claimed invention is directed to a hologram system. The system has a recording medium (e.g., reference numeral 10 in Fig. 2; it is noted that all reference numerals being used herein are for the Examiner's clarity and understanding and not for limiting the claims) made of a photosensitive material, and a hologram recording and reproducing apparatus (Fig. 1). The apparatus has a supporting part (19 in Fig. 2), a signal light beam optical system (16, 6a, 14, 12, 13, in Fig. 2), a reference light beam optical system (16, 17, 18 in Fig. 2), a photodetector (22 in Fig. 2), and a data processing part (103 in Fig. 2).

The supporting part loadably supports the recording medium.

The signal and reference light beam optical systems allow a coherent signal light beam and a coherent reference light beam, respectively, to enter the recording medium. The coherent signal light beam is modulated in response to predetermined data (i.e., digital recording data supplied from the encoder 25 as described in p. 8, line 14). The coherent signal light beam and the coherent reference light beam intersect and interfere in the recording medium to make an interference pattern. The interference pattern produces a grating in the recording medium.

The photodetector receives reproduction light from the grating and converts the received light into an electrical signal. The reproduction light is produced when the recording medium is irradiated with the coherent reference light beam.

The data processing part demodulates the electrical signal to the predetermined data. The data processing part has a reference memory (101 in Fig. 2) storing pieces of reference data (e.g., R1, R2, R3 as described in p. 6, lines 9-15) in advance of the predetermined data.

The recording medium has a reference data area (301 in Fig. 3) storing at least one piece of reference data (R2 in Fig. 3) stored in the reference memory of the data processing part in advance of the predetermined data.

The data processing part calculates a difference between the reproduced reference data from the reference data area and the reference data stored in the reference memory. The difference exhibits an error sum of a recording error of the apparatus that performed recording in the recording medium, and a reproduction error of the recording medium itself.

At least the last paragraph bridging pages 6-7 of the specification supports new claim 13 including a feature that, in the data processing part, discrimination of a kind of the recording medium is performed with the reproduced reference data from the reference data area.

At least lines 19-23 on page 7 of the specification support the new claim 14 including a feature that, the data processing part performs demodulation on the predetermined data while using the difference exhibiting the error sum, whereby the predetermined data can be reproduced correctly.

In a conventional holographic recording system, optical strain, signal image displacement, and the like that occur from the spatial light modulator to the photodetector by a recording medium when the recording medium is newly loaded must fall within a predetermined range of values. Further, when a recording medium recorded on one system is reproduced by another system, the reproduced image may be displaced due to variations such as in the positions from the recording medium to the charge coupled device (CCD) image pickup device at the times of recording and reproduction. Thus, the CCD or the recording medium must be adjusted precisely.

The claimed invention, on the other hand, has a reference refractive index grating

created with reference data in advance, and the reproduced data is corrected in response to the reference data reproduced from the reference refractive index grating of the reference data area and reference data provided within a reference memory. Thus, the predetermined data can be reproduced correctly.

THE PRIOR ART REFERENCES

The Richardson Reference

The Examiner alleges that certain features of the invention are disclosed in Richardson. However, Applicants submit that there are elements of the claimed invention that are neither taught nor suggested by Richardson.

Particularly, Richardson fails to teach or suggest at least “wherein said data processing part is provided with a reference memory for storing pieces of reference data in advance of the predetermined data,” as recited in new independent claim 12.

Further, Richardson fails to teach or suggest at least “wherein said recording medium has a reference data area for storing at least one of pieces of reference data stored in the reference memory of said data processing part in advance of the predetermined data,” as recited in independent claim 12.

Further, Richardson fails to teach or suggest at least “said data processing part calculates a difference between the reproduced reference data from the reference data area and the reference data stored in the reference memory, the difference exhibiting an error sum of a recording error of the apparatus that performed recording in the recording medium and of a reproduction error of the recording medium,” as recited in independent claim 12.

Instead, Richardson discloses using test signals to estimate the behavior within a particular area of the data page. No cite to any reference is given to support the Examiner’s position that the test signals of Richardson are equivalent to the reference data of the present invention. Reference data of the present invention embodies specific information, defined with respect to each recording format. For example, it may be defined to indicate low, middle, or high density recording formats (e.g., see Specification, p. 6, line 8 – p. 7, line 13).

Richardson, on the other hand, discloses test signals which contain no information about the hologram system. “*According to embodiments of the invention, it is only necessary*

for the test signal data members to establish some sort of redundancy throughout at least a portion of a data image page and/or across at least two data image pages.” Richardson, col. 4, lines 3-7. “[A] portion of the data members written to the storage medium are encoded as a fixed pattern of test signal data members, i.e., a fixed pattern of 1s and 0s.” Richardson, col. 4, lines 13-16.

The Examiner alleges that Richardson discloses “*The correction or the normalization is to correct the retrieved or reproduced data from the inconsistency that may have been present in the storage medium. Richardson teaches that the data processing part includes interpolator and estimator, (please see Figure 2), which implicitly suggests the data processing process also includes reference data provided by the data processing part.*”

However, Richardson fails to teach or suggest wherein “said data processing part calculates a difference between the reproduced reference data from the reference data area and the reference data stored in the reference memory, the difference exhibiting an error sum of a recording error of the apparatus that performed recording in the recording medium and of a reproduction error of the recording medium,” as recited in new independent claim 12.

Richardson fails to disclose or suggest the use of reference data. Richardson fails to disclose storing reference data in the reference memory of the data processor.

Richardson also fails to disclose or suggest calculating a difference between the reproduced reference data from the recording medium and the reference data stored in the reference memory of the data processor. Richardson fails to disclose or suggest the calculated difference between the reference data in the data processor and the reproduced reference data from the recording medium exhibiting an error sum of a recording error of the apparatus that performed the recording and of a reproduction error of the recording medium.

Instead, Richardson discloses a test signal which does not contain any useful information. Richardson fails to disclose or suggest the test signal being determined by the recording apparatus or the recording medium.

Richardson fails to disclose or suggest calculating a difference between reference data on the recording medium and reference data in the data processor. Richardson fails to disclose or suggest this difference exhibiting an error sum of a recording error of the apparatus and a reproduction error of the recording medium.

Instead, Richardson discloses “*the estimation, modeling and/or determination of the value of one or more detected test signal data members (or, e.g., their collective average value) within an area gives a general indication of the behavior within that particular area of the data image page, including the behavior of the data members therein.*”

Thus, Richardson only attempts to compensate for variations in the recording medium.

In the present invention, “[b]y performing demodulation on the reproduction of the data recorded in the recording medium while taking the difference E1 into consideration, even when the reproduced data is different from the predetermined data, the predetermined data can be recreated correctly” (e.g., see Specification, p. 7, lines 19-23).

Richardson, in contrast, discloses, “[b]ased on the results of estimating step 16, a normalizing step 18 normalizes the known and estimated data member values, e.g., using a normalizer 26. For example, normalizer 26 uses conventional techniques, including the use of the interpolation techniques of another interpolator (shown as 27), to adjust the data member values accordingly. The extent of normalization varies depending on the eventual use or application of the data member values.” Richardson uses the test signal to generate estimates to normalize the reproduced data. Richardson is unable to recreate the predetermined data correctly if the reproduced data differs from the predetermined data.

Thus, Richardson fails to teach or suggest at least these features of new claims 12-14.

The Snyder Reference

The Examiner alleges that Richardson, in view of Snyder, discloses certain features of the claims. However, Applicants respectfully submit that there are elements of the claimed invention which are neither taught nor suggested by Snyder, alone or in combination with Richardson.

In particular, and as discussed above, Richardson fails to disclose or suggest at least wherein “said data processing part is provided with a reference memory for storing pieces of reference data in advance of the predetermined data,” or, “said data processing part calculates a difference between the reproduced reference data from the reference data area and the reference data stored in the reference memory, the difference exhibiting an error sum of a

Application No. 10/522,679

Attorney Docket: US01-04072PCT (FUJI.067)

recording error of the apparatus that performed recording in the recording medium and of a reproduction error of the recording medium.” Snyder fails to overcome these deficiencies of Richardson.

Instead, Snyder (even assuming arguendo that it would have been obvious to combine Snyder with Richardson), like Richardson discussed above, discloses only compensating for distortion in the storage medium. Snyder fails to disclose or suggest storing reference data in the data processor. Snyder fails to disclose or suggest calculating a difference between the reference data in the data processor and reference data reproduced from the recording medium. Snyder fails to disclose or suggest this difference exhibiting an error sum of a recording error of the apparatus and a reproduction error of the recording medium.

Thus, Snyder fails to teach or suggest at least these features of claims 12-14.

Application No. 10/522,679
Attorney Docket: US01-04072PCT (FUJI.067)

CONCLUSION

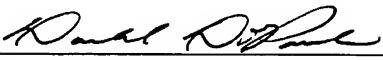
In view of the foregoing, Applicant submits that claims 12-14, all the claims presently pending in the application, are patentably distinct over the prior art of record and are allowable, and that the application is in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned attorney at the local telephone number listed below to discuss any other changes deemed necessary for allowance in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. The Commissioner is authorized to charge any deficiency in fees, including extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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